DOCUMENT RESUME

ED 352 463 CE 062 552

AUTHOR	Rasmussen, Bonnie
TITLE	Workplace Basic Skills in the Metal Casting Industry for World Class Process and Technology.
INSTITUTION	Central Alabama Community Coll., Alexander City.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, DC. National Workplace Literacy Program.
PUB DATE	1 Oct 92
CONTRACT	V198A10120
NOTE	29p.; For related lessons, see CE 062 554.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Adult Basic Education; Assembly (Manufacturing); *Basic Skills; Cooperative Programs; Curriculum Development; *Foundries; Learning Activities; Lesson Plans; Machine Tools; Metal Industry; *Metal Working; *On the Job Training; *Outcomes of Education; Program Effectiveness; Program Evaluation; Semiskilled Occupations; *Skill Development
IDENTIFIERS	*Workplace Literacy

ABSTRACT

A workplace basic skills project for the metal casting industry was established jointly by Central Alabama Community College and Robinson Foundry, Inc. Evaluation of the project was made through a commercial test of hourly workers' general literacy level gains, instructor-developed pre- and posttests of mastery of the industrial process and mastery of concepts of management curriculum, and through exit surveys of workers' satisfaction with the training and performance mastery of the industrial process. Results showed that 303 workers enrolled and 216 completed their studies. The completers showed an overall gain of approximately three grade levels. In addition, an 87 percent mastery of knowledge of the industrial process was achieved, ratings by supervisors of employees' mastery of the industrial process were high, 67-85 percent of participants perceived learning gains in the various content and skill areas addressed, and equipment downtime was reduced. A broad range of dissemination activities and a set of curriculum materials were developed, including 15 lessons. A third-party evaluation is attached. It confirmed the findings of the project's self-evaluation. (KC)

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PERFORMANCE REPORT
PR/AWARD NO: V198A10120
submitted October 1, 1992

Workplace Basic Skills in the Metal Casting Industry for World Class Process and Technology

Robinson Foundry, Incorporated
and
Central Alabama Community College

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

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I. Review of Original Goals and Objectives

A. Employee outcomes

Job advancement: Job advancement opportunities will be provided for approximately one-half of the Robinson Foundry employees.

This objective has been met, for those employees as of August 31, 1992. (See 'Employee Turnover Rate', p. 9)

Knowledge of the industrial process: A 90% mastery of the knowledge of the industrial process will be attained by employees using performance-based testing and instructional material and resources developed by the project staff.

This objective was very nearly met, since 87% mastery was attained. (See 'Industrial Process Examination' results, p. 5)

Performance mastery of the industrial process: A performance mastery of the industrial process, based on an observational checklist will be completed on each employee by the immediate supervisor.

This objective was met. (See 'Supervisors' Ratings of Post-program Participants', p. 6)

GED completion: Sixty percent of voluntary participants will achieve a GED or high school equivalency status.

This objective was not met, and is now considered unreasonable, due to the formal educational attainment and tested achievement levels of students entering the program. (See 'General Educational Development (GED) Test' results, p. 8)

Achievement gains: Final evaluation of achievement gains on the screening instrument is projected to show an overall gain of approximately 3 grade levels.

This objective was met. (See 'Test of Adult Basic Education (TABE)' results, p. 5)

B. Industry outcomes

Certification standards: Certification standards of major customers will be met or exceeded.

This objective has been met in terms of worker understandings that will be formally documented in certification interviews beginning in January, 1993. (See 'Certification Standards', p. 9)

Productivity levels: Productivity levels will increase through a 60% reduction of industrial scrap.

This objective has been met. (See 'Productivity', p. 9)

Equipment down time: Equipment down time will be reduced to 9% from previous 15% schedule.

This objective has been met, as far as available data indicates. (See 'Equipment downtime', p. 9)

Turnover rate: Annual turnover rate of employees will be reduced by 50%.

Outcomes of this objective are not possible to measure in a meaningful fashion, due to extraneous factors. (See 'Employee turnover rate', p. 9)

II. Evaluation Methodology

The assessment in the Program was developed to be a) an integral part of the learning process; b) a measurement of trainee performance and or knowledge; and c) an official reporting device for the project. Information reported in two interim progress reports was used to refine and direct training in process.

The evaluation plan sought to measure two areas: employee outcomes and industry outcomes, as directly related to the grant objectives. Tables 1 and 2 list the components of the assessment plan.

A. Employee Outcomes

TABLE 1
Participant Data

Instrument name	Outcome measured	Type of measurement
TABE* locator	Hourly workers' general literacy level	commercial test
Knowledge of the Industrial Process tests	Hourly workers' knowledge mastery of industrial process	Instructor-developed pre and post tests
Employee Training Surveys	Hourly workers' satisfaction with training	Instructor-developed entrance and exit surveys
Concepts of Management Tests	Supervisor's mastery of concepts of management curriculum	Instructor-developed pre and post tests
Supervisor Rating of Post-program Participants	Hourly workers' performance mastery of the industrial process	Instructor-developed survey

GED**	Hourly workers' mastery of high school curriculum	commercial test

*Test of Adult and Basic Education
**General Education Development test

B. Industry Outcomes

TABLE 2
Industry Data

Measurement device	Outcome measured	Type of measurement
RF* Certification report	Certification Standards	RF Quality Control records
RF Productivity and Scrap report	Productivity, scrap	RF manufacturing records
RF Equipment down time report	Equipment down time	RF manufacturing records
RF turnover rate report	Employee turnover	RF personnel records

*Robinson Foundry

III. Summary of findings

A. Participant Data (Table 3)

Table 3 (on the next page) shows details about all participants who enrolled and began study during the grant period. The class names along the left side refer to class sessions, when students were being taught in groups of between 6-12 per class. Altogether, 303 workers were enrolled, tested and began classes; of these, 216 completed their study (compare "Employee Outcomes, p.). Completion of a class is defined as attendance at all 16 hours of instruction. The gender, race and age distribution shown in Table 3 accurately reflects the same factors in the Robinson Iron workforce as a whole. About 10% of the workforce is female, and about one-third of the workforce is white. Management participation details (19 out of 34 white, and 1 out of 34 female) show the different makeup of this subgroup of the workforce.

TABLE 3

Participant Data
(Includes all enrolled and pretested participants)

	m/f	all trainees	age 20-29	age 30-39	age 40-49	age 50+	b/w
Pilot*	7/0	7	2		3	2	6/1
Ind. Proc.* 1	24/1	25	8	9	3	5	16/9
Ind. Proc. 2	26/3	29	10	12	5	2	17/12
Concepts of Mgt.** 1	10/0	10	1	6	2	1	4/6
Concepts of Mgt. 2	9/0	9	1	3	3	2	4/5
Ind. Proc. 3	27/5	32	6	5	12	9	24/8
Ind. Proc. 4	10/1	11	2	2	5	2	9/2
Ind. Proc. 5	27\5	32	5	7	10	10	24/8
Concepts of Mgt. 3	10/0	10	3	4	2	1	5/5
Concepts of Mgt. 4	4/1	5	1	2	1	1	2/3
Ind. Proc. 6	49/4	53	20	13	12	8	37/16

Ind. Proc. 7	43/5	48	18	14	8	8	35/ 19
GED	25/7	32	20	7	3	2	26/6
Totals	271/ 32	303	97	84	69	53	209/ 94

*Hourly workers' workplace basics class, designated as 'Industrial Process' class.
**Super-visors' Concepts of Management class
***General Education Development test

B. Hourly Worker Outcomes

This section shows measured outcomes for the 216 hourly workers who completed the entire 16 hours of workplace basics class. The First Report period was 3/11/91 - 11/1/91; Second Report period was 11/2/91 - 3/1/92; and the Third Report period was 3/2/92 - 8/31/92.

a. Test of Adult Basic Education (TABE) Locator Test

The TABE Locator pretest average of scores for all participants and all sessions fell in the TABE 'E level' which equates with a primary grand 2.6 - 4.9 range of mastery in reading, writing and math. The post-test score average moved into the TABE 'M level',which equates with a primary grade range of 4.6 - 6.9. Therefore, the achievement gains objective 'to show an overall gain of approximately 3 grade levels' was achieved.

	Pretest	Post-test
1st report	26 (grade 2.6 - 4.9)	33 (grade 4.6 - 6.9)
2nd report	27 (grade 2.6 - 4.9)	31 (grade 4.6 - 6.9)
3rd report	29 (grade 2.6 - 4.9)	36 (grade 4.6 - 6.9)
Entire grant period (n=216)	27 (grade 2.6 - 4.9)	33 (grade 4.6 - 6.9)

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b. Industrial Process Examinations (average percentage correct)

The Industrial Process Examination is the instructor-designed test of workplace-specific reading, writing and arithmetic knowledge and skills. In each of the three report periods test scores raised by over 20%, and the final post-test average of all

student scores showed 87% mastery. (The grant objective was 90% mastery.)

	Pretest	Post-test
1st report	48%	87%
2nd report	47%	88%
3rd report	63%	86%
Entire grant period (N=216)	53%	87%

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c. Supervisor Ratings of Post-program Participants

Reductions in workforce along with accompanying changes in shift and job assignments for remaining production and supervisory staff negated the accuracy of supervisors' ratings of post program participant performance for the third reporting period. However, satisfaction with the JOBS programs was high on the ratings obtained earlier in the grant, and the 'performance mastery of the industrial process' objective was met.

Supervisors rated the effects of the JOBS Training Program on employees as follows:

	1st Report	2nd Report	3rd Report	Entire Grant Period
improved in their job attitude	73%	69%	NA	71%
improved in the quantity of their work	56%	56%	NA	56%
improved in the quality of their work	45%	55%	NA	49%
improved in their attendance	45%	32%	NA	32%
improved in their job knowledge	64%	59%	NA	62%

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d. Employee Training Surveys

The Employee Training Survey information does not relate directly to any stated objective of the grant proposal, but was used to monitor participant (hourly worker) perceptions of the program. Survey instruments were not developed in time for collection of data during the first report period. Entry Survey responses showed strong positive links between participants' goals and program goals. The Exit Survey responses documented that 67% - 85% of participants perceived learning gains in the various content and skill areas addressed.

Entry Survey

Questions	% responding yes 1st Report	2nd Report	3rd Report	Entire grant period
Would you like to...				
improve your job performance?	N/A	93%	94%	93%
learn to use a computer?	N/A	94%	92%	94%
read and understand better?	N/A	91%	94%	92%
improve your math?	N/A	97%	94%	96%

Exit Survey

Questions	% responding yes 1st Report	2nd Report	3rd Report	Entire Grant Period
Did the JOBS Program...				
improve your job performance?	N/A	75%	67%	70%
help qualify you for future job postings?	N/A	72%	68%	70%
help you to read and understand better?	N/A	88%	77%	82%
improve your ability to talk so that others understand your ideas?	N/A	77%	74%	75%
improve your ability to				

think clearly and solve problems?	N/A	81%	88%	85%
help you to write clear, correct messages?	N/A	77%	78%	78%
improve your math?	N/A	72%	67%	67%
help you to learn to use a computer?	N/A	75%	83%	80%
improve your work as a team member?	N/A	85%	83%	84%

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e. General Educational Development Test (GED)

The thirty-two people who studied in preparation for taking the General Educational Development Test (GED) were working with upper primary and lower highschool level study materials. Research has shown that many years of study are necessary for adult learners at these levels to increase their skills sufficiently to pass the General Educational Development Test (GED). The grant objective, 'sixty percent of voluntary participants will achieve a GED or high school equivalency status' was not realistic, and was not achieved.

	1st Report	2nd Report	3rd Report	Entire Grant Period
Number of trainees attending classes.	7	13	12	32

C. SUPERVISOR OUTCOMES

The supervisors in the JOBS program achieved the 90% mastery level aimed for in the knowledge of the industrial process grant objective.

Mastery level, Concepts of Management

Pre-test	Post-test
79	90

D. INDUSTRY OUTCOMES

a. Certification Standards

Internal pre-certification surveys have shown considerable progress toward meeting required standards. The JOBS training has been validated in interviews where production workers could explain both process and record keeping devices. A comprehensive Robinson Foundry Quality Manual is being written, and certification visits from major customers (including Caterpillar, Magnetek, and Siemens Energy and Automation Group) are being scheduled for around January of 1993.

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b. Productivity

Record keeping has been formalized, and a steady improvement in scrap, customer returns, and ontime delivery has been documented. Major factors affecting production during the grant period were installation of Disamatic machines, shut down of other machinery, and implementation of new process sheets and additional SPC record keeping. JOBS training fostered understanding of process changes (eg., so that workers could regulate iron pouring temperatures or read and understand iron chemistry specifications). In addition, the training enabled workers to enter SPC data, to better understand SPC charts and diagrams, and to follow directions.

Scrap:	Disamatic	3/11/91: 16.0%	8/31/92: 10.7%
	EPS line	3/11/91: 20.1%	8/31/92: 14.0%
Customer returns:		3/11/91: 4.5%	8/83/92: 2.2%
Ontime Delivery		3/11/91 10.0%	8/31/92: 72.0%

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c. Equipment downtime

Records on equipment downtime were not formally kept until July 1, 1992. A 5 % improvement in uptime was recorded from 7/1/92 - 8/31/92.

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d. Employee turnover rate

Installation of new machinery (resulting in creation of 70 - 100 new jobs); shut down of other machinery (resulting in job losses); several layoffs (causing both job losses and reassignment of jobs and shift times); and the recession in the American economy have all impacted the employee turnover rate at Robinson Foundry.

IV. Dissemination Activities

A broad range of dissemination methods are being pursued cooperatively by both industry and college personnel.

Publications

Articles for *Modern Casting* (one in June 1992 issue, one in preparation)

Articles in *The Outlook, Alexander City* newspaper (July 17, 1991; July 19, 1991; July 23, 1991; March 22, 1992)

Letters to Congressmen and Legislators (two letters sent)

Articles in academic journals (two submitted)

Article in *The Central Focus*, Central Alabama Community College External Newsletter (Summer, 1992)

Presentations

National Meeting of Foundry Presidents (July, 1991)

Adult Education Southeastern Regional Conference (July, 1992)

National Special Education Association Conference (to be presented in Feb., 1993)

American Foundry Society (AL) meeting (to be presented during 1993)

South Talladega Personnel Association (June, 1992)

Kiwanis Club of Alexander City (1991)

Rotary Club of Alexander City (1991)

Publicity

Open House (July 19, 1991)

Demonstration of curriculum developed; Keynote speaker Mr. William Blount, III (March 20, 1992)

Correspondence and cooperation with foundry education programs

Cartland Foundry and Waukesha County Technical College workplace education project; Waukesha, WI

Quality Castings Co. education initiative, Orrville, OH

Wheland Foundry, Chattanooga, TN

CAI and print curriculum materials

(See 'Additional Information' on p. for description of curriculum developed.)

To the extent possible, CAI materials developed using a software authoring system will be made available to interested parties in 3 1/2 inch format.

Selected print materials will be edited and provided to ERIC and OTAN On-line Communication Systems.

V. Additional Information

An extensive array of curriculum materials has been developed, consisting of worksheets, reference sheets, teaching materials, crossword puzzles, and learning packages. The printed learning

packages have been covered and bound. They compare in appearance and durability to commercial materials, but all content is workplace-specific.

In the list below, the number of pages in each lesson is given, followed by the workplace-specific content, and then the basic skill being taught

Lesson 1: Green Sand Schedule

82 pages; schedule of Green Sand job orders used throughout the foundry; reading and understanding schedules

Lesson 2: The Core Room

16 pages; airset and shell cores; reading comprehension

Lesson 3: The Core Room

7 pages; core room vocabulary; word recognition and use for early readers

Lesson 4: Figuring Time

24 pages; down time on production forms; adding and subtracting time

Lesson 5: The Cleaning Room

8 pages; cleaning room vocabulary; word recognition and use for early readers

Lesson 6: The EPS Process

18 pages; production of EPS castings; reading comprehension for advanced readers

Lesson 7: Green Sand

8 pages; green sand vocabulary; word recognition and use for early readers

Lesson 8: EPS-1

7 pages; EPS vocabulary; word recognition and use for early readers

Lesson 9: EPS-2

8 pages; names of EPS departments; word recognition, map reading

for early readers

Lesson 10: Grinding Production Sheet

16 pages; reading and understanding forms for advanced readers

Lesson 11: Building and Grounds
7 pages; Building and Grounds vocabulary; word location and use exercises, map reading for early readers

Lesson 12: Molding Production Sheet
37 pages; reading, interpreting and filling in occupational forms for advanced readers

Lesson 13: Forms

37 pages; reading, interpreting and filling in occupational forms for advanced readers

Lesson 14: Grinding Production Form

34 pages; reading, interpreting and filling production forms for advanced readers

Lesson 15: RF Vocabulary

50 pages; word recognition exercises (using print and audio resources) for early readers

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Customized computer-assisted instruction packages have been developed using Course Creator authoring software. This format consists of pre and post tests and an interactive lesson section. Blinking words, colors, symbols, charts, illustrations, graphics and photographs (scanned into the lesson) ensure a lively, varied presentation using images and language from Robinson Foundry. In addition to being attractive and engaging, the instructional format addresses various learning styles.

In the list below, the number of screens in each lesson is given, followed by the workplace-specific content, and then the basic sill area being taught.

Lesson Package I: Safety

1. **Back Injury**
2. **Safety - Depends Upon You!**
3. **Safety Equipment**

102 screens; safety, vocabulary and symbols, recognizing cause and effect, predicting outcomes for advanced readers

Lesson 4: Forms: the Shipping Ticket

52 screens; Robinson Foundry forms; reading, interpreting and filling in forms for advanced readers

Lesson 5: Your Robinson Checkstub

53 screens; Robinson Foundry checkstub; calculating time, adding and subtracting whole numbers, and reading mathematical information for all readers.

NOTE: All of the above lessons focus on teaching literacy skills using workplace-specific (foundry) materials. They do not directly teach vocational or life skills. The students are not taught computer literacy skills, but are taught to use the computers for the computer-assisted lessons.

Third Party Evaluation Report 10/1/92
PR/AWARD No: V198A10120

WORKPLACE BASIC SKILLS
in the
METAL CASTING INDUSTRY
for
WORLD CLASS PROCESS and TECHNOLOGY

Robinson Foundry, Incorporated
and
Central Alabama Community College

Evaluator

Mary Bauer

Mary Bauer
Dean of Continuing Education
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CE 062552

Introduction

In March 1991, Central Alabama Community College and Robinson Foundry, Incorporated established a partnership to improve workplace basic skills in the metal casting industry for world class process and technology. During the next 18 months, staff members employed by the college worked with representatives of the industry to develop and implement Job Oriented Basic Skills (JOBS), a program that included three separate training strands:

--Integration of workplace basic skills using company training manuals, safety manuals, policy manuals, forms, and related material;

--Supervisory training in skill areas required to facilitate hourly employee training; and

--Long-term literacy support for basic reading skills and second-chance learning or GED preparation.

The major focus of the project was on the first of these areas, workplace basic skills. Of the 303 employees who participated in the project, 237 (78%) were hourly employees enrolled in the 16-hour industrial process class. Thirty-four employees participated in the supervisory training, and 32 worked toward a GED certificate. All classes were taught during release time in a mobile learning facility leased by the industry and located adjacent to the foundry.

Project staff submitted progress reports to the U.S. Department of Education in November 1991 and March and October 1992. Dr. Brent Halverson, Assistant Professor, Auburn

University, served as a third party evaluator during the initial phase of the project.

This evaluation is based on a review of the grant application and previous project reports; a visit to the instructional site on August 31, 1992; interviews with staff members and industry employees; and a review of literacy task analyses, individual learning plans, assessment results, curriculum materials, and other project records.

Interviews/Employee Perceptions

During the on-site visit, the following persons were interviewed:

Bob Stone, Project Director
Bonnie Rasmussen, Curriculum Development Consultant
Sandra Mann, Instructor/Counselor
Beth Maxwell, Instructor
Linda Smith, Secretary/Computer Assistant
Jim Koeppen, Corporate Director of Quality and Technology
Donnie Maddox, Superintendent, Melt Department
Tyrone Dandridge, Final Inspector, Cleaning Room
James McCoy, Iron Pourer, Pallet Line Department

The evaluator was impressed with the project personnel. Their dedication to providing a quality instructional program to meet the needs of Robinson Foundry employees was evident during discussions. Interviews with project participants confirmed these impressions. One of the supervisors explained that the instructors spent a great deal of time with employees, including time after class with those who had the greatest need to improve work-related reading skills. He expressed particular satisfaction

that employees in his department had learned to read instructions and charts required to perform their jobs.

One employee reported that math instruction was especially helpful. He explained that he had forgotten much of what he had learned in school, and that he had learned to figure ranges and plot charts. He expressed an interest in attending more classes as long as they related to his job.

A comment frequently expressed by employees was that the classes not only helped them in their current jobs, but also helped them to learn about other departments and to understand how their jobs and other jobs fit together in the total operation of the foundry.

Employee perceptions were verified by exit surveys administered during the second and third reporting periods. These surveys indicated that approximately 70 percent to 85 percent of the participants considered the JOBS project to have helped them to improve skills in reading, writing, computation, problem-solving, working as team members, and using computers. Seventy percent (70%) also reported that the project had helped them to improve their job performance and qualify for future job postings. Retention rate for participants in all groups was 71 percent.

Objectives and Accomplishments

The grant application included eight objectives related to employee and industry outcomes. This section compares actual project accomplishments with the original objectives.

> Objective 1: Job advancement opportunities will be provided for approximately one-half of the Robinson Foundry employees.

Achievement of this objective was greatly affected by employee turnover during the grant period. Project staff report that the objective was met for persons employed as of August 31, 1992. Interviews with industry representatives confirmed that employees are now better equipped to move from unskilled jobs to semiskilled jobs and that Robinson Foundry is attempting to upgrade as many employees as possible through anticipated growth in the company.

> Objective 2: A ninety-percent mastery of the knowledge of the industrial process will be attained by employees using performance-based testing and instructional material and resources developed by the project staff.

Instructors developed and administered pre- and post- tests to measure workplace-specific reading, writing, and computation skills of the 216 employees who completed the industrial process training. Results showed an average post-test mastery of 87 percent for the combined groups over the project period. Instructors administered the Test of Adult Basic Education (TABE) locator as a pre- and post-test to verify literacy gains. Although it is difficult to interpret exact results, the summary data reflect average achievement gains of two to three grade

levels. Although many employees needed additional instruction, they did not continue classes beyond the 16 hours for which release time was provided.

> Objective 3: A performance mastery of the industrial process, based on an observation checklist will be completed on each employee by the immediate supervisor.

Project staff developed a mastery checklist based on a supervisor rating form in Literacy at Work by Jorie Philippi. Supervisors used the observation checklist to certify performance mastery for the employees who completed the industrial process training during the first 12 months of the project. The highest ratings were found in improvement of job attitude (71%) and improvement of job knowledge (62%). All ratings, however, were positive. Supervisors indicated that 6 percent increased quantity of work, 49 percent improved quality, and 32 percent improved attendance.

> Objective 4: Sixty percent of voluntary participants will achieve a GED or high school equivalency status.

Interviews with Robinson Foundry representatives confirmed that this was not a major focus on the project, and therefore, the industry provided no release time or other incentives to encourage participation in this part of the project. Although 32 employees did work on a volunteer basis toward completion of the GED certificate, no one had achieved that goal by the end of the grant period. Given the employees' low educational levels indicated by the TABE locator, the evaluator agrees with the project staff's conclusion that this objective was not a realistic one. Since

this objective is included in the second-year project, it is suggested that the industry provide some incentives for GED preparation and that the staff develop specific strategies for recruiting and retaining those employees most likely to benefit from this level of instruction.

Objective 5: Certification standards of major customers will be met or exceeded.

Industry representatives expect this objective to be met when certification visits are completed early in 1993. Pre-certification surveys and validation of employees' mastery of knowledge of the industrial processes are encouraging evidence of progress in meeting the quality standards of Robinson's automotive customers.

Objective 6: Productivity levels will increase through a 60 percent reduction of industrial scrap.

Robinson Foundry representatives report increases in productivity levels from the beginning of the grant period (March 11, 1991) to the end of the grant (August 31, 1992). Their records show a significant increase in ontime delivery and some decreases in scrap and customer returns. These results, however, are affected by factors other than the literacy project.

Despite intervening factors such as installation of new machinery and changes in work procedures, Robinson's Director of Quality and Technology gives much credit to the JOBS program for facilitating understanding of process changes and improving literacy skills needed for regulating iron pouring temperatures,

understanding chemistry specifications, reading charts and diagrams, plotting charts, and following directions.

Objective 7: Equipment downtime will be reduced to nine percent from previous 15 percent schedule.

Project staff reported and industry representatives confirmed that equipment downtime records were not maintained until the last two months of the project. A five percent reduction was recorded during that period. Industry representatives have assumed responsibility for maintaining data on equipment downtime throughout the second year of the project.

Objective 8: Annual turnover rate of employees will be reduced by 50 percent.

Both project staff and industry representatives confirm that major external factors affecting Robinson Foundry during the past 18 months made it impossible to measure the impact of the JOBS training on employee turnover rate. Conversion to new machinery, the economic recession, and other factors resulted in job losses and job reassignments as well as new jobs.

Other Project Outcomes

Supervisor Training. Project records indicate that the 34 supervisors who completed the 16-hour concepts of management classes offered during the first 12 months of the project achieved 90 percent mastery of course content. The project director conducted this training and developed a pre- and post-test to assess mastery.

Curriculum Development. The curriculum development consultant, instructors, and computer assistant are to be commended for the creation of a variety of workplace-specific computer-assisted instructional materials and print materials. See attached list of materials reviewed.

During the start-up phase of the project, instructors conducted formal literacy task analyses to determine literacy skills needed to perform various jobs. The instructors reported, however, that informal interviews with employees and supervisors, reviews of process sheets and work forms, and "internships" in the foundry provided an equally effective framework for creating materials to improve job knowledge and basic skills application.

Curriculum materials were developed at two reading levels and included pre- and post-tests, reference sheets, worksheets, crossword puzzles, and learning packages. Although difficulties were encountered in using the authoring system purchased for the project, the instructors and the computer assistant succeeded in creating workplace specific software comparable to many commercial packages. All materials created will be used or adapted for use during the second year of the project with Robinson Foundry and three other companies in the Robinson group.

Despite their accomplishments in developing industry-specific materials, staff members expressed a need for assistance in this area. Therefore, it is suggested that, where possible, funds

should be allocated for staff development and technical assistance in creating quality workplace-specific curriculum materials.

Project Management. One of the strengths of this project is effective management by all members of the staff. The project director and other staff of Central Alabama Community College have successful records of exemplary project administration. The curriculum development consultant has been a major asset in providing leadership for staff development, curriculum development, and other project management activities.

At the outset, staff developed materials and methods to assist in project management. These included a statement of philosophy to guide their efforts and survey forms and assessment instructions to monitor progress in accomplishing objectives.

The computerized data tracking system envisioned in the grant application was not implemented because of technical limitations of the project's computer equipment and time limitations of the staff. Other data collection methods proved sufficient, however, and will be continued in the next project.

The advisory committee structure that was established to strengthen communication and management efforts may become more important in the second year of funding as the project expands to other companies in the Robinson group. It is suggested that both industry representatives and college staff work to maintain an actively functioning advisory committee.

Dissemination Activities. Staff members have already disseminated project information through publications such as industrial trade journals, presentations at education and industrial conferences, correspondence with other metal casting companies, and local activities with business leaders and community groups. Appropriate materials will be submitted to the ERIC Clearinghouse on Adult, Career and Vocational Education, Regional Curriculum Coordination Center, and U.S. Department of Education.

Summary and Conclusions

Central Alabama Community College and Robinson Foundry have developed an effective employee centered partnership to improve workplace basic skills in the metal casting industry. Despite the difficulty of establishing a direct correlation between literacy gains and productivity measures, it is evident that employees who participated in this project improved job knowledge, attitudes, and skills. The most significant benefits to be gained are probably those that cannot be measured within the current grant period. Extending the length of projects such as this would enable staff to more effectively evaluate long-term effects on the employees and the industry.

CURRICULUM MATERIALS

Print Materials

Lesson 1: Green Sand Schedule

82 pages; schedule of Green Sand job orders used throughout the foundry; reading and understanding schedules

Lesson 2: The Core Room

16 pages; airset and shell cores; reading comprehension

Lesson 3: The Core Room

7 pages; core room vocabulary; word recognition and use for early readers

Lesson 4: Figuring Time

24 pages; down time on production forms; adding and subtracting time

Lesson 5: The Cleaning Room

8 pages; cleaning room vocabulary; word recognition and use for early readers

Lesson 6: The EPS Process

18 pages; production of EPS castings; reading comprehension for advanced readers

Lesson 7: Green Sand

8 pages; green sand vocabulary; word recognition and use for early readers

Lesson 8: EPS-1

7 pages; EPS vocabulary; word recognition and use for early readers

Lesson 9: EPS-2

8 pages; names of EPS departments; word recognition, map reading for early readers

Lesson 10: Grinding Production Sheet

16 pages; reading and understanding forms for advanced readers

Lesson 11: Building and Grounds
7 pages; Building and Grounds vocabulary; word location and use exercises, map reading for early readers

Lesson 12: Molding Production Sheet
37 pages; reading, interpreting and filling in occupational forms for advanced readers

Lesson 13: Forms

37 pages; reading, interpreting and filling in occupational forms for advanced readers

Lesson 14: Grinding Production Form

34 pages; reading, interpreting and filling production forms for advanced readers

Lesson 15: RF Vocabulary

50 pages; word recognition exercises (using print and audio resources) for early readers

Computer-Assisted Materials

Lesson Package I: Safety
1. **Back Injury**
2. **Safety - Depends Upon You!**
3. **Safety Equipment**

102 screens; safety, vocabulary and symbols, recognizing cause and effect, predicting outcomes for advanced readers

Lesson 4: Forms: the Shipping Ticket

52 screens; Robinson Foundry forms; reading, interpreting and filling in forms for advanced readers

Lesson 5: Your Robinson Checkstub

53 screens; Robinson Foundry checkstub; calculating time, adding and subtracting whole numbers, and reading mathematical information for all readers.